

- c) [Means]means to receive resonant illumination from said resonator means;
- d) trained pattern recognition means[Means] to process said received resonant illumination to determine the location of said illuminated resonator; and,
- e) [Output]output means in response to said illuminated resonator location determination to affect said at least one other system within said vehicle.

PLEASE ADD CLAIM 69 (if no additional fee due).

69. The invention in accordance with claim 19 wherein said illumination comprises acoustic radiation.

REMARKS

Claims 19 and 28 were amended (proposed) to make clear that SUBSTANTIAL data of actual "said at least one occupant" are used for training to result in the "trained pattern recognition means".

Claim 47 was proposed to be amended back to the original application to have the original limitation as meant: "trained pattern recognition means".

Claim 69 was conditionally added.

The Applicant, if necessary to have allowance of the claims (i.e. all independent claims), is willing to have a further limitation and distinction over the prior art as follows:

Wherever the claim term **"trained pattern recognition means"** appears, to have in its stead **--trained neural computer network means --;**

Support for same is found pursuant to the entire referenced NeuralWare book referenced in the original specification and attached hereto.

Re: Claims 19-29, 33-36, 47-49, 63 (should be 68).

Note: Group IV of Requirement for Restriction also included claim 37 (window closing system), which seems inaccurate for inclusion.

As to the definition of "seatbelt usage" impliedly requested for support references, see p. 18, p. 28 top

Similarly, please see Fig. 15, resonator 602 onto front surface of the seatbelt

The following paragraph numbers match that of the Final Action.

1. Please cancel claim 8. Claim 69 was added to claim what was desired by the amendment of claim 8.

2. The Examiner objects to the specification as not providing clear support or antecedent basis for

"trained on data of said at least one occupant".

See p.5, at l. 11: "The class may be ... one containing all human occupants, or all human occupants not sitting in a rear facing child seat...".

See p. 14, l. 14: "Alternately there will be similarities between all images of people sitting on the seat, regardless of what they are wearing, their age or size. The problem is to find the "rules" which differentiate the occupant images from the rear-facing child seat images. The similarities of these images for various child seats are frequently not obvious to a person looking at plots of the time series and thus computer algorithm are developed to sort out the various patterns.

The determination of these rules is central to the pattern recognition techniques used in this invention... In others, such as the determination of the presence of ... an occupant, artificial neural networks are used to determine the rules. One such set of neural network software for determining the pattern recognition rules is available from NeuralWare of Pittsburgh, PA.

The system used for the determination of the presence of an occupant... was the artificial neural network. In this case, the network operates on the two returned signals as sensed by transducers 131 and 133. Through a training session the system is taught to differentiate between the three cases. This is done by conducting a large number of experiments... Similarly a sufficiently large number of experiments are run with human occupants... As many as 1000 such experiments are run before the neural network is sufficiently trained so that it can differentiate... and output the correct decision with a very high probability.

Once the network is determined, it is possible to examine the result using tools supplied by NeuralWare, for example, to determine the rules which were finally arrived at by the trial and error techniques... In either case, the

implementation can be carried out by those skilled in the art of pattern recognition."

At p. 30, l. 11: "A neural network, or other pattern recognition system, can be trained to recognize certain people as permitted operators of a vehicle..."

It is thus clear that the term "trained on data of said at least one occupant" is supported and enumerated in the original specification.

3. The Examiner objected to certain informalities which were corrected by this Proposed Amendment After Final.

In claim 19, l. 8, "Pattern" was replaced by --pattern--;

In claim 47, l. 4, "Means" was replaced by --means--,

1. 6, "Resonator" was replaced by --resonator--,

1. 10, "Means" was replaced by --means--,

1. 15, "Output" was replaced by --output--;

In claim 24, l. 2, "measn" was replaced by --means--;

In claim 28, l. 6, "Pattern" was replaced by --pattern--;

In claim 47, l. 4, "Means" was replaced by --means--,

1. 6, "Resonator" was replaced by --resonator--,

1. 10, "Means" was replaced by --means--,

1. 12, "Means" was replaced by --means--,

1. 15, "Output" was replaced by --output--.

4. The Examiner objects to the specification under 35 U.S.C. 112, first paragraph, as failing to provide an enabling written description of the claimed invention. Allegedly the specification fails to provide an adequate written description of how a pattern recognition means is trained. The Examiner concurs that the Applicant has stated that such software is available from NeuralWare of Pittsburgh, PA.

The Applicant has attached hereto a certain handbook from said NeuralWare which should provide sufficient disclosure to the Examiner as to training methods for pattern recognition. (NEURAL COMPUTING- A Technology Handbook for Professional II/PLUS and NeuralWorks Explorer, NeuralWare, Inc., Penn CenterWest, IV-227, Pittsburgh, PA. 15276, © 1993)

5. Claims 19-27, 28-29, and 33-36 were rejected under 35 U.S.C. 112, first paragraph for the reasons set forth in the above (§4) objection to the specification.

Claims 19, 28 were proposed to be amended to clearly distinguish over the prior art and being limited to trained pattern recognition, not deterministic or heuristic methods.

6/7. Claims 19, 20, 28, 29, 33, 34, 36, 47, and 63 (renumbered from 68, but in Applicant's opinion should be renumbered

back to 68) were rejected over Ishikawa et al., U.S. Patent 4,625,329 (under 35 U.S.C. 103).

A grouping of the above-listed claims follows:

A. Claims 19, 20 (dependent on 19), 28, 29 (dependent on 28), 33 (dependent on 28), 36 (dependent on 28), 63 (renumbered from 68/dependent on claim 19)

B. Claim 47

Ishikawa et al. uses heuristic deterministic means, NOT A TRAINED pattern recognition machine trained on substantial actual occupants and/or objects (image/reflection data. It should also be understood that "occupants" could also mean dummies if that is a standard that the auto industry would embrace at some point.

Therefore, since each of these claims includes the TRAINED pattern recognition limitation, said training of actual data being described on pp;. 14,15 of the specification, the Applicant believes that the claims of Group A are novel, distinguishable over the prior art, and patentable.

While the "training" type of pattern recognition theory is known, and tools unrelated to a particular application do exist, such as from NeuralWare Corp., the novelty of using the training of actual occupants and objects to produce a TRAINED pattern recognition machine is believed clear as

a) no one has done so prior to the instant application, and

b) merely because a tool exists does not require that any new use found for such tool to be lacking in patentable novelty. Take MINOXIDIL, for example. It was originally a tool/compound to treat heart problems Its side effect in causing hair to grow for certain males having male pattern baldness was considered novel by the Patent Office and became a separately-issued patent.

c) It would not have been obvious to apply a theory usually used in biologic image analysis at the closest, to recognize human occupants, rear-facing child seats, shopping bags, boxes, and other auto interior objects, and further to train on such actual data where the subjects are in various positions and facings. This is certainly novel. No one has used actual data for occupant recognition for automobile interior applications. The Examiner has found no applicable prior art. Novelty is believed to lie with the instant inventor.

The Examiner also states that "trained pattern recognition" is known in the art to be equivalent to other means". The Applicant respectfully disagrees. Ishikawa et al., for example, is a fixed deterministic algorithm which

does not consider actual human/dummy occupant reflected image data training using said occupants in various real positions and facings. Note in the cited reference, it applies to only a standard-size Caucasian facing forward. The cited reference only works, if at all, if the occupant is Caucasian, faces forward, is of some standard size and features. That is, reason enough to show the need for the instant invention and its novelty. The instant invention was designed to handle "real-life" situations and occupants, and to take into consideration, a predominance of human occupants of various races, facings, sizes, and feature variations. Similarly for other objects.

B. Claim 47 was rejected as the Examiner considers an occupant a resonator. A resonator of itself must return a much stronger signal than transmitted.

At p. 26, 4th line from the bottom:

"Acoustic resonators are devices which resonate at a preset frequency when excited at that frequency. If such a device has been tuned to 40 kHz. is subjected to ultrasonic radiation at 40 kHz., for example, it will return a signal which is much stronger than the reflected radiation..."

No signal is transmitted to a human will return a much stronger signal back, reflection or otherwise. Therefore, the Applicant strongly disagrees that a mammalian occupant, will be a resonator.

Claim 47 was reamended back to its original pattern recognition limitation.

8. Claims 21-27, and 49 were rejected under 35 U.S.C. 103 as being unpatentable over Ishikawa et al., U.S. Patent 4,625,329, in view of Fujita, U.S. Patent No. 5,074,583.

a. Fujita controls an air bag system as a function of a person's height (as a crude measure of size) or position (as determined by devices placed on the seat).

Claim 21 -- frontal airbag system for front seat.

Ishikawa et al. as noted above, is a deterministic method unrelated to TRAINED pattern recognition. Further, there is nothing in Fujita to suggest another type of sensor means. Note the term "seating condition sensor" in Fujita, "taking into consideration seat position, reclining angle, passenger size, and posture. A control unit controls operation of the air bag device, in accordance with the seating condition of the passenger" (quoted therefrom).

b. As to claim 26, said claim was rejected pursuant to the Examiner's statement that such inflators are conventional and would have been included in the combination.

Claim 26 depends on claim 20, which itself depends on claim 19.

Claim 19, as amended, is limited to trained pattern recognition means, and thus can handle a wide assortment of real human occupants and real objects and facing positions of both. It is thus respectfully submitted that this claim 26 combining trained pattern recognition and thus consideration of 1) real human data of varying facings, positions, racial and size characteristics combined with

2) a VARIABLE inflation gas inflator, where the variable inflation rate is based on the position and other features as determined by the actual-data-trained pattern recognition machine is novel, as it would be much more accurate, and significantly less of a guesswork/estimate situation as Ishikawa would determine

The cited prior art uses deterministic and/or heuristic means or is based on sensors placed on various parts of the seating mechanism, and again is much more of a guesstimate. Thus the accuracy would make a VARIABLE inflation gas inflator useful. Since the resultant position and other determinations by the instant invention would be more accurate than that of the prior art, the calculated inflation rate would, as a result, also be significantly more accurate and useful, and thus the combination is synergistic.

c. As to claims 27 and 49, the Examiner asserts such sensors are conventional and would have been included in the combination.

1) Claim 27 as amended previously, depends on claim 20, and includes an electronic crash sensor having a settable threshold triggering level with seatbelt usage being a factor in the setting of the sensor threshold. Claim 20 depends on claim 19.

Claim 20 specifies an occupant as being within the vehicle. Claim 19 as amended is limited to (actual data) TRAINED pattern recognition, as noted in the arguments above, and thus is distinguishable over the prior art.

2) Claim 49 is similar to claim 27, and depends on claim 47, but involves a resonator means attached to said seatbelt. Claim 47 was amended to revert to its original limitation, especially in light of the art, although somewhat nebulous cited (The Anonymous disclosure cited).

9. Claim 35 was rejected under 35 U.S.C. 103 as being unpatentable over Ishikawa et al. as applied to claim 30,

and further in view of Yano et al., U.S. Patent No. 5,125,686.

Claim 35 includes an adjustable seatbelt anchorage system-- it depends on claim 28. Claim 28 includes a trained pattern recognition machine which has been trained on data including at least one occupant. As claim 30 involves a directional microphone, the rejection reference to claim 30 is not understood.

Ishikawa et al., as noted before, does not involve trained pattern recognition. Yano et al. involves a MANUALLY-adjustable position adjusting device for a shoulder belt of a seat assembly.

Claim 28, last phrase, "...to affect another system within said vehicle", as applied by claim 35 means that the adjustable seatbelt anchorage system would be AUTOMATICALLY adjustable-- NOT MANUALLY adjustable. It thus seems that the citation of Yano et al. is inapplicable, and not on point enough to directly combine as a barring reference.

10/11. Claim 47 was rejected under 35 U.S.C. 102(b) as being anticipated by Research Disclosure No. 35,519 (RF tag on infant seat which when resonates inhibits deployment of airbag..

As noted above, the Applicant has amended this claim back to its originally intended trained pattern recognition limitation.

12. Claim 49 was rejected under 35 U.S.C. 103 as being unpatentable over Research Disclosure No. 35,519.

Claim 49 depends on claim 47, but includes an electronic crash sensor having a variable deployment threshold, and the resonator means is attached to the seatbelt to determine, by its position, the use of the seatbelt by the occupant to affect the deployment threshold of the crash sensor.

As noted above, claim 47 was amended back to its originally-intended trained pattern recognition limitation, and thus any settings automatically made will be much more accurate than any of the methods based on a seatbelt/seat resonator.

WHEREFORE, the Applicant believes that the application, as amended and proposed to be amended hereby would put the application in proper form and substance to be allowed, and respectfully requests such consideration, and hopefully allowance in due course. An interview would be appreciated.

Respectfully submitted,
FOR THE APPLICANT,

Samuel Shiplowitz

Samuel Shipkovitz
PTO Reg. No. 30,107
(5829 Nicholson Street
Pittsburgh, PA. 15217)

Mailing: P.O. Box 2961
Address Arlington, VA. 22202
703/521-2345; 412/521-3234, 3390

March 29, 1996

encl.: "NEURALWARE COMPUTING- A Technology Handbook ..." as
referenced above